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Fall 2020

## PHYS 234-HM1: Physics III

Andrew Jerez

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Instructor: **Andres Jerez:** [jerez@njit.edu](mailto:jerez@njit.edu)

Lecture Times: Mondays and Wednesdays, 12:30 PM – 1:50 PM,  
Converged Learning: TLH 1 and Synchronous Online via Webex

Office hours: Online, Wednesdays 3:00pm-5:00pm, and by appointment.

**PREREQUISITE:** Math 112 or 112H

**FAILURE TO MEET EITHER CO-Requisites or PRE-Requisites will result in student being dropped from class.**

### **COURSE MATERIAL:**

- **Mastering Physics Homework System (REQUIRED):** Each student must enroll in the course specified by the instructor by obtaining access to Mastering Physics for University Physics with Modern Physics, 15th edition, Young and Freedman, Pearson (June 14th 2019) - Copyright © 2020. There are several purchase options based on duration and whether or not the e-book is included. Please see this link <https://www.pearson.com/store/p/university-physics-with-modern-physics/P100002510958>  
Here are the instructor and course information needed for registration:
  - Instructor's Course ID: jerez31895
  - Course Name: 2020234HM1Homework assignments will be posted online. Students login, solve the assigned problems, and submit answers to the automated grading system.
- **Textbooks:** The homework and the structure of the course follows Mastering Physics for University Physics with Modern Physics, 15th edition, Young and Freedman, Pearson, which can be obtained as an ebook with the Mastering Physics registration. It is not a requirement, as opposed to MasteringPhysics. However, I strongly encourage you to have access and use to a College Physics textbook. An alternative to consider may be the Openstax textbooks, <https://openstax.org/details/books/university-physics-volume-3> (and volume 1 as well).

### **ELEMENTS OF THE COURSE:**

**CANVAS:** The Learning Management System at NJIT is [Canvas](#) . Lecture notes, some assignments, grades, exams, and additional course material will be managed through Canvas.

**LECTURES:** Lectures follow the [Converged Learning Mode](#). It is expected that students will attend all lectures and recitations. Attendance will be taken at all classes and exams. More than 3 unexcused absences (in total) are excessive. If you have excusable absences contact the Dean of Students. If you must withdraw from the course, do it officially through the Registrar. Do not simply stop attending and taking exams: that forces the instructor to assign a course grade of "F."

### **EXAMS:**

**Common Exams** There will be three common exams during the semester. The exams will be given online, using Canvas and ProctorU Review+ software for proctoring. The exam schedule is:

- Common Exam 1: Monday, October 12<sup>th</sup> 4:15 – 5:45 PM, Online
- Common Exam 2: Monday, November 9<sup>th</sup> 4:15 – 5:45 PM, Online
- Common Exam 3: Monday, November 30<sup>th</sup> 4:15 – 5:45 PM, Online

The general policy is that students who miss a common exam will receive a score of zero for that Exam. That score will be included in the calculation of your final grade. Students that miss two common exams automatically fail the course. Students who anticipate an absence from a common exam should discuss their situation with their instructor **PRIOR TO** their absence. In order to be qualified to receive a "make-up" common exam score (a very rare occurrence), the student should present documentation for not being able to take the test as scheduled. As is the standard policy of NJIT,

this documentation should be presented to the student's Physics 234 instructor AND to the Dean of Students [dos@njit.edu](mailto:dos@njit.edu) - (973) 596-3466, Campus Center, Room 255. BOTH the Physics 234 instructor and Dean of Students must concur in permitting a "make-up" common exam. Students who miss common exams that do not present documentation within 7 days of the common exam will receive a score of zero for the common exam.

In the event that the above qualification is met, a separate make-up test for the missed common quiz will not be offered. Instead, the portion of the final exam relevant to the contents of the missed test will be considered for giving a grade for the missed test. The instructor will evaluate the final exam questions from those chapters and normalize this portion of the student's grade for the missed common quiz.

Final Exam: Online, Friday December 18<sup>th</sup>, 7:30am-10:00am.

**HOMEWORK:** assignments will be posted online using the Mastering Physics Homework System: [www.masteringphysics.com](http://www.masteringphysics.com) (see above).

**QUIZZES AND ASSIGNMENTS:** Starting sometime in October, there will be additional online quizzes and activities on the topics covered.

**GRADING:** Your final letter grade in Phys 234 will be based on a composite score for term's work that includes the common exam scores, the final exam, and the homework score.

***Final Letter Grades:*** Here are the weights to be used for calculating the composite score:

- 45% for the three common exams (15% each)
- 25% for the final exam
- 15% for the total of homework work
- 15% for the quizzes and assignments

The cutoff percentages for various letter grades will be in the range of:

85% for A  
80% for B+  
70% for B  
65% for C+  
50% for C  
40% for D  
F below 40 %

Final grades are not negotiable: A score of 84.999999% is a B+, not an A.

**LAST DAY TO WITHDRAW:** November 9<sup>th</sup>

**ONLINE EXAMS, PROCTORU REVIEW+:**

*NJIT policy requires that all midterm and final exams must be proctored, regardless of delivery mode, in order to increase academic integrity. Note that this does not apply to essay or authentic based assessments. Effective beginning Fall semester 2019, students registered for a fully online course section (e.g., online or Hyflex mode) must be given the option to take their exam in a completely online format, with appropriate proctoring.*

In this course you will be required to use the following proctoring method to ensure academic integrity for exams. Please see NJIT's response to questions about online proctoring [here \(Links to an external site.\)](#). See below for more information about how exams will be proctored in this course.

**ProctorU Review+ (Auto):**

ProctorU Review+ uses an automated proctoring solution via AI during the exam, followed by a full review from a ProctorU proctor. Similar to Respondus Monitor, you will be recorded during the exam. After completing their review, a proctor sends an incident report to the instructor if any potential academic integrity violations occur. You will access your exam by installing the ProctorU browser extension in either Chrome or Firefox. After logging into the browser, you

can access your exam and proceed to the ProctorU startup sequences. [Instructions are available for students \(including links to a practice quiz\).](#)

Students will need to make a test-taker account at [proctoru.com](https://proctoru.com) ([Links to an external site.](#)).

In order to use this ProctorU service, you will need the following:

- High-speed internet connection
- Webcam (internal or external)
- Microphone and Audio (internal or external)
- Windows or Apple Operating System
- NJIT ID or Photo-Issued ID

After making your ProctorU account, download the browser extension for either [Chrome \(Links to an external site.\)](#) or [Firefox \(Links to an external site.\)](#) and log into your account via the browser extension. After logging into the browser, you can access your exam in your course and proceed to the ProctorU startup sequences. As long as you are logged into the browser with your ProctorU account, you will not need an exam password or access code; the browser extension will automatically enter that information to open the exam for you.

Important: ProctorU recommends that you visit <https://test-it-out.proctoru.com/> ([Links to an external site.](#)) to test your equipment prior to your proctoring session. We recommend you click on the button that says "Connect to a Live Person" to fully test out your equipment.

Important Notice for OSX Users: You will need to [enable screen sharing in your browser \(Links to an external site.\)](#) prior to taking the exam.

If you encounter technical difficulties with your exam, you should contact ProctorU's 24/7 technical support via [Live Chat \(Links to an external site.\)](#) or call 855-772-8678.

[More Information and Tips on Ensuring a Smooth Experience](#)

**HONOR CODE STATEMENT:** NJIT has a zero-tolerance policy for cheating of any kind and for student behavior that disrupts learning by others. Violations will be reported to the Dean of Students. The penalties range from a minimum of failure in the course plus disciplinary probation up to expulsion from NJIT. Avoid situations where your own behavior could be misinterpreted as dishonorable. **Students are required to agree to the NJIT Honor Code on each exam, assignment, quiz, etc. for the course.**

- Statement on Academic Integrity:
  - *“Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: <http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>.*

*Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at [dos@njit.edu](mailto:dos@njit.edu)”*

**HELP:** Contact your instructor if you are having trouble with the course; do not simply hope for a miracle and fall further behind. There is online tutoring offered by the Physics Department. For information and appointments follow this link: <https://physics.njit.edu/physics-tutoring-sign-sheet>

### **LEARNING OUTCOMES:**

- Recall the definitions and relationships involving oscillations and waves, such as wavelength, frequency, angular frequency, amplitude, phase, wave speed, restoring force, longitudinal and transverse waves, standing waves, damping, interference, diffraction, Doppler shift, and other wave phenomena.
- Comprehend the meaning of the equations governing oscillations and waves, and be able to manipulate them to obtain any desired quantitative relationship. Understand the extension of these equations to the quantum realm (wave-particle

duality) for free particles, atoms and nuclei. Generalize the concepts underlying the equations, such as restoring force, inertia, and energy.

- Apply the equations governing oscillations and waves to mechanical systems for various boundary conditions, to optical systems, and to quantum physics in atomic and nuclear systems. Calculate unknown quantities based on physical relationships, boundary conditions, and known quantities.
- Analyze graphs of oscillatory and wave phenomena to obtain wavelength, frequency, amplitude, phase, particle and wave position, velocity, acceleration, damping time constant, as a function of time. Identify and distinguish types of wave motion such as transverse, longitudinal, standing waves, reflection, and refraction.
- Evaluate the soundness and precision of your answers. Explain and interpret your solutions to problems in a way that shows deeper understanding. Identify and appraise the range of applicability of your results, and their limitations.

TOPIC	TEXT STUDIES
Week 1 Oscillations	Chapter 14 – Sections 1-8
Week 2 Waves	Chapter 15 – Sections 1-8
Week 3 Sound	Chapter 16 – Sections 1-8
Week 4 Light	(Chapt. 32 – Sections 1-3) Chapt. 33 – Sections 1-7
Week 5 Geometric Optics	Chapt. 34 – Sections 1-4
Week 6 Interference	Chapt. 35 – Sections 1-4
Week 7 Diffraction	Chapt. 36 – Section 1-7
Week 8 Relativity	Chapt. 37 – Sections 1-8
Week 9 Photons	Chapt. 38 – Sections 1-4
Week 10 Particles and Waves	Chapt. 39 – Sections 1-6
Week 11 Quantum Mechanics	Chapt. 40 – Sections 1-5
Week 12 Atomic Structure	Chapt. 41 – Sections 1-6
Week 13 Molecules and Condensed Matter	Chap. 42 – Sections 1-3
Week 14 Band Structure, PN Junction, & Transistors	Chap. 42 – Sections 4-7

**Thanksgiving Break: November 26 – November 29**  
**Wednesday, November 25, follows Friday Schedule**

***LAST DAY OF CLASSES: Thursday, December 10***

***READING DAYS: December 11, 14***

***FINAL EXAM PERIOD: December 15 – December 21***